



Disclosure to Promote the Right To Information

Whereas the Parliament of India has set out to provide a practical regime of right to information for citizens to secure access to information under the control of public authorities, in order to promote transparency and accountability in the working of every public authority, and whereas the attached publication of the Bureau of Indian Standards is of particular interest to the public, particularly disadvantaged communities and those engaged in the pursuit of education and knowledge, the attached public safety standard is made available to promote the timely dissemination of this information in an accurate manner to the public.

“जानने का अधिकार, जीने का अधिकार”

Mazdoor Kisan Shakti Sangathan

“The Right to Information, The Right to Live”

“पुराने को छोड़ नये के तरफ”

Jawaharlal Nehru

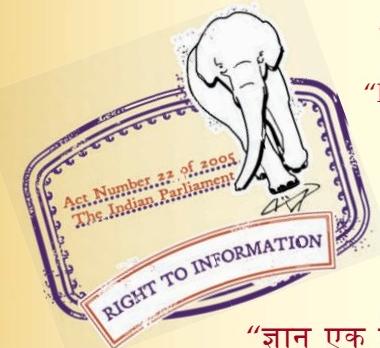
“Step Out From the Old to the New”

IS 10714-20 (2001): Technical Drawings - General Principles of Presentation, Part 20: Basic Conventions for Lines [PGD 24: Drawings]

“ज्ञान से एक नये भारत का निर्माण”

Satyanareshwar Gangaram Pitroda

“Invent a New India Using Knowledge”



“ज्ञान एक ऐसा खजाना है जो कभी चुराया नहीं जा सकता है”

Bhartṛhari—Nītiśākām

“Knowledge is such a treasure which cannot be stolen”



BLANK PAGE



PROTECTED BY COPYRIGHT

भारतीय मानक

तकनीकी ड्राइंग — प्रस्तुतीकरण के सामान्य सिद्धांत
भाग 20 लाइनों की मूल परिपाटी

Indian Standard

TECHNICAL DRAWINGS — GENERAL PRINCIPLES OF PRESENTATION

PART 20 BASIC CONVENTIONS FOR LINES

ICS 01.100.01

© BIS 2001

BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

NATIONAL FOREWORD

This Indian Standard (Part 20), which is identical with ISO 128-20 : 1996 'Technical drawings — General principles of presentation — Part 20 : Basic conventions for lines', issued by the International Organization for Standardization (ISO) was adopted by the Bureau of Indian Standards on the recommendation of Drawings Sectional Committee and approval of the Basic and Production Engineering Division Council.

ISO 128 was published in 1982 and was accordingly adopted as IS 10714 : 1983. Now ISO has published ISO 128-20 : 1996. In view of the above the committee may decide to adopt ISO 128-20 : 1996. This standard (Part 20) establishes the types of lines, their designations and their configurations, as well as general rules for draughting of lines used in technical drawings, for example, diagrams, plans or maps. Other part of this series is given as follows:

IS 10714 (Part 21) : 2001 Technical drawings — General principles of presentation : Part 21 Preparation of lines by CAD systems.

The text of ISO standard has been approved as suitable for publication as Indian Standard without deviations. In this adopted standard, certain terminology and conventions are not identical to those used in the Indian Standards. Attention is particularly drawn to the following:

- a) Wherever the words, 'International Standard' appear referring to this standard, they should be read as 'Indian Standard'.
- b) Comma (,) has been used as a decimal marker while in Indian Standards, current practice is to use a full point (.) as the decimal marker.

This adopted standard also gives Bibliography in Annex A which is informative. The corresponding Indian Standards against the ISO standards are given below along with their degree of equivalence for the editions indicated:

<i>International Standard</i>	<i>Corresponding Indian Standard</i>	<i>Degree of Equivalence</i>
ISO 128-21 : 1996	IS 10714 (Part 21) : 2001 Technical drawings — General principles of presentation: Part 21 Preparation of lines by CAD systems	Identical
ISO 5455 : 1979	IS 10713 : 1983 Scales for use on technical drawings	do
ISO 6428 : 1982	IS 10164 : 1985 Requirement to execute technical drawings for microcopying	do

Indian Standard

TECHNICAL DRAWINGS — GENERAL PRINCIPLES OF PRESENTATION

PART 20 BASIC CONVENTIONS FOR LINES

1 Scope

This part of ISO 128 establishes the types of lines, their designations and their configurations, as well as general rules for draughting of lines used in technical drawings, e.g. diagrams, plans or maps.

2 Definitions

For the purposes of this part of ISO 128, the following definitions apply.

2.1 line: Geometrical object, the length of which is more than half of the line width and which connects an origin with an end in any way, e.g. straight, curved, without or with interruptions.

NOTES

- 1 The origin and the end may coincide with one another, e.g. in the case of a line forming a circle.
- 2 A line, the length of which is less than or equal to half of the line width, is called a dot.
- 3 A test should be made in order to check the appearance of drawings intended to be microcopied or transferred by fax.

2.2 line element: Single part of a non-continuous line, e.g. dots, dashes, which vary in length, and gaps.

2.3 line segment: Group of two or more different line elements which form a non-continuous line, e.g. long dash/gap/dot/gap/dot/gap.

3 Types of lines

3.1 Basic types

Table 1

No.	Representation	Description
01	—	continuous line
02	— — — — —	dashed line
03	— — — — — —	dashed spaced line
04	— — — — — — —	long dashed dotted line
05	— — — — — — — —	long dashed double-dotted line
06	— — — — — — — — —	long dashed triplicate-dotted line
07	dotted line
08	— — — — — — — — —	long dashed short dashed line
09	— — — — — — — — — —	long dashed double-short dashed line
10	— — — — — — — — — —	dashed dotted line
11	— — — — — — — — — —	double-dashed dotted line
12	— — — — — — — — — — —	dashed double-dotted line
13	— — — — — — — — — — —	double-dashed double-dotted line
14	— — — — — — — — — — — —	dashed triplicate-dotted line
15	— — — — — — — — — — — —	double-dashed triplicate-dotted line

3.2 Variations of the basic types of lines

Possible variations of the basic types of lines in accordance with table 1 are given in table 2.

Table 2

Representation	Description
	uniform wavy continuous line
	uniform spiral continuous line
	uniform zigzag continuous line
	freehand continuous line

NOTE — Table 2 contains only variations of the basic type of line No. 01. Variations of the basic types Nos. 02 to 15 are possible and are presented in the same way.

3.3 Combinations of lines with the same length

3.3.1 Arrangement of two or more lines parallel to each other

For examples see figure 1.

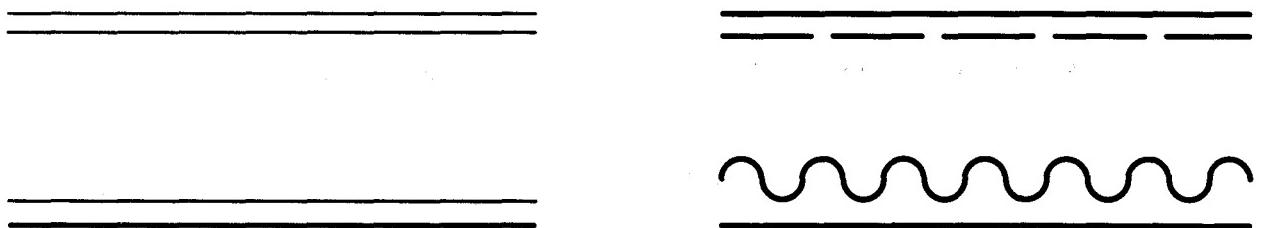
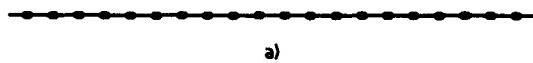


Figure 1

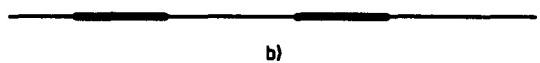
3.3.2 Arrangement of two different types of lines

- a) With different line widths superimposed.

See figure 2 a) and b) for examples [figure 2 a): a continuous and a dotted line; figure 2 b): a continuous and a dashed spaced line].



a)



b)

Figure 2

- b) Arranged next to each other.

See figure 3 for an example (two continuous lines either side of two dashed spaced lines).



Figure 3

3.3.3 Arrangement of two continuous lines parallel to each other with regularly recurring connecting elements between them

See figure 4 a) and b) for examples [figure 4 a): blackened circular elements; figure 4 b): blackened trapezoidal elements].



a)



b)

Figure 4

3.3.4 Arrangement of regularly recurring geometric pictorial elements in association with continuous lines

- a) Without interruption of a continuous line.

See figure 5 for examples.

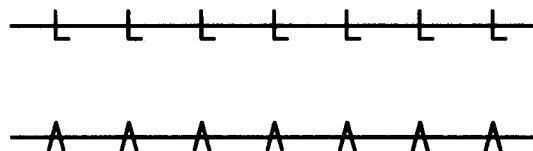


Figure 5

- b) With interruption of a continuous line.

See figure 6 for examples.

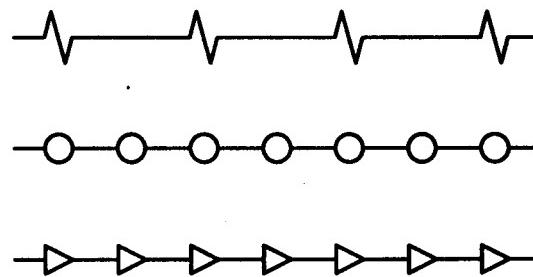


Figure 6

4 Line dimensions

4.1 Line width

The width, d , of all types of lines shall be one of the following depending on the type and size of the drawing. This series is based on a common ratio $1:\sqrt{2}$ ($\approx 1:1.4$):

0.13 mm; 0.18 mm; 0.25 mm; 0.35 mm; 0.5 mm; 0.7 mm; 1 mm; 1.4 mm; 2 mm

The widths of extra wide, wide and narrow lines are in the ratio 4:2:1.

The line width of any one line shall be constant throughout the whole line.

4.2 Deviation in line width

Line widths may deviate from those specified in 4.1 providing that it is possible to differentiate unambiguously between two adjacent lines with different widths. If drawing equipment which produces constant line width is used, the deviation in line width between two such lines shall not be greater than $\pm 0.1d$.

4.3 Configuration of lines

For the preparation of drawings by hand the lengths of line elements should conform to those of table 3.

Table 3

Line element	Line type No.	Length
Dots	04 to 07 and 10 to 15	$\leq 0,5d$
Gaps	02 and 04 to 15	$3d$
Short dashes	08 and 09	$6d$
Dashes	02, 03 and 10 to 15	$12d$
Long dashes	04 to 06, 08 and 09	$24d$
Spaces	03	$18d$

NOTE — The lengths shown in this table are valid for line elements with semi-circular and squared ends. In the case of line elements with semicircular ends, the length of the line element corresponds to the distance covered by a technical pen (with a tubular tip and using India ink) from the origin up to the end of the line element. The total length of such a line element is the sum of the length shown in table 3 plus d .

Formulae for the calculation of some of the basic types of line and line elements are given in ISO 128-21. The formulae are intended to facilitate the preparation of drawings using computer-aided design (CAD) systems.

5 Draughting of lines

5.1 Spacing

The minimum space between parallel lines should not be less than 0,7 mm, unless rules to the contrary are stated in other International Standards.

NOTE 4 In certain cases when computer-aided drawing techniques are used, the spacing of lines on the drawing does not represent the actual spacing, e.g. for the representation of screw threads. This fact has to be considered when data sets are established, e.g. for the operation of machine tools.

5.2 Junctions

5.2.1 Types

The basic types of lines, Nos. 02 to 06 and Nos. 08 to 15 should preferably meet at a dash; see figures 7 to 12.

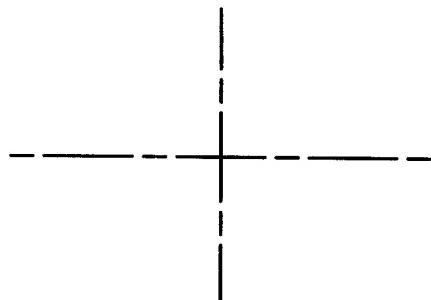


Figure 7

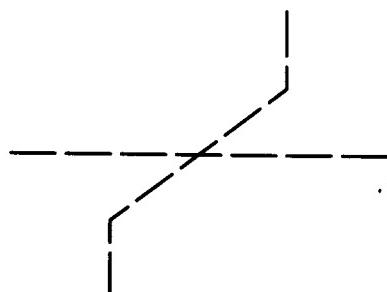


Figure 8

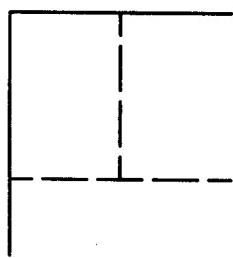


Figure 9

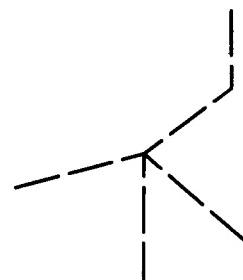


Figure 10

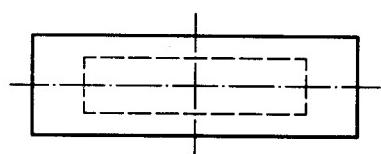


Figure 11

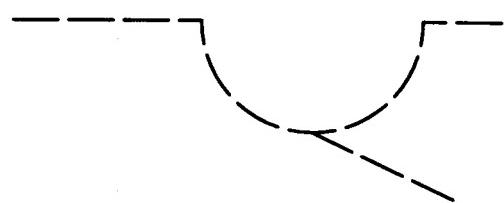


Figure 12

Lines of basic type No. 07 should preferably meet at a dot, see figure 13.

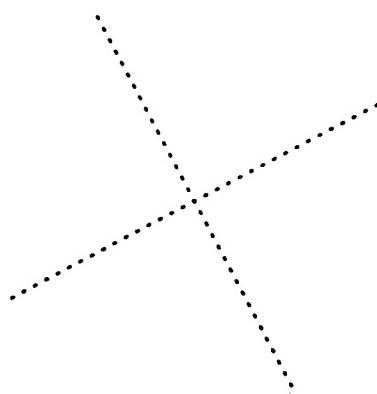


Figure 13

5.2.2 Representation

The requirement of 5.2.1 shall be fulfilled by starting the lines at the junction (see figure 14) or by using a complete, or partial, cross formed by dashes (see figures 15 and 16).

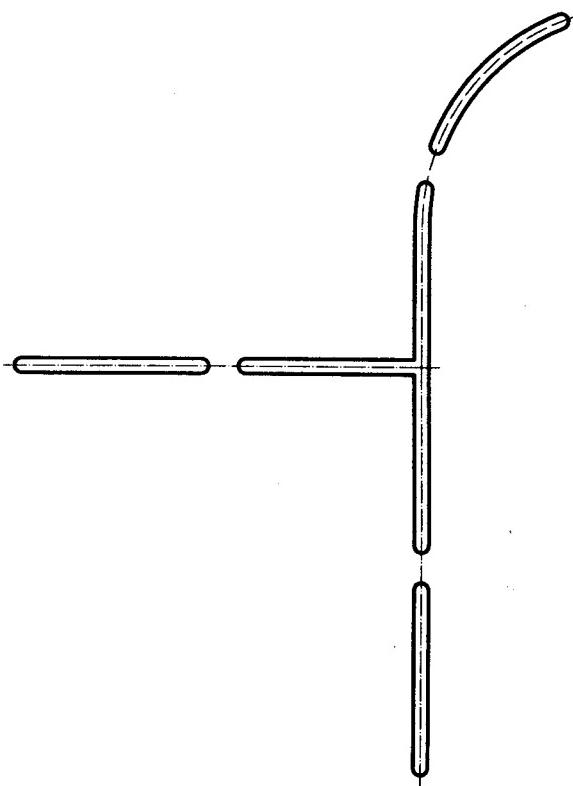


Figure 14

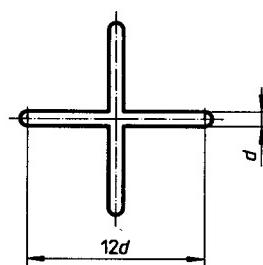


Figure 15

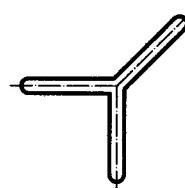


Figure 16

5.3 Location of a second line

Two different ways of draughting two parallel lines are shown in figure 17 a) and b). The preferred version is shown in figure 17 a) (the second line is drawn below or to the right of the first line).

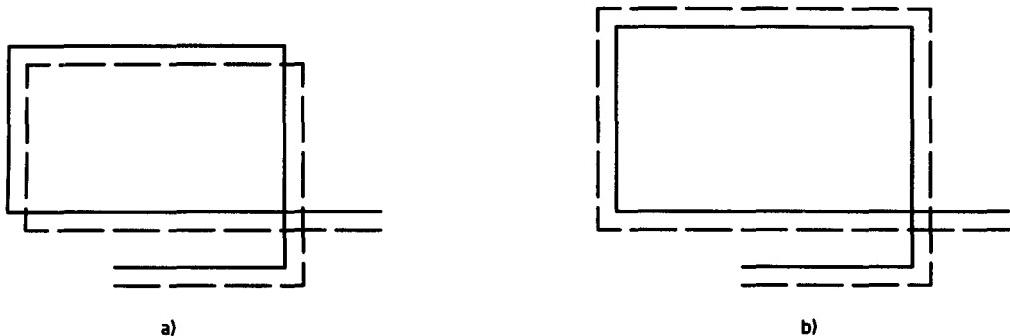


Figure 17

6 Colours

Lines shall be drawn in black or white depending on the colour of the background. Other standardized colours may also be used for drawing standardized lines. In this case, the meaning of the colours shall be explained.

7 Designation

The designation of the basic types of lines shall comprise the following elements in the order given:

- a) "Line";
- b) reference to this part of ISO 128;
- c) the number of the basic type in accordance with table 1;
- d) the line width in accordance with 4.1;
- e) the colour (if applicable).

EXAMPLES

Designation of a line of type No. 03 (03), line width 0,25 mm (0,25):

Line ISO 128-20 - 03 × 0,25

Designation of a line of type No. 05 (05), line width 0,13 mm (0,13) and white in colour:

Line ISO 128-20 - 05 × 0,13 / white

Annex A (informative)

Bibliography

- [1] ISO 128-21:1996¹⁾, *Technical drawings — General principles of presentation — Part 21: Preparation of lines by CAD systems.*
- [2] ISO 1219-1:1991, *Fluid power systems and components — Graphic symbols and circuit diagrams — Part 1: Graphic symbols.*
- [3] ISO 3511-1:1977, *Process measurement control functions and instrumentation — Symbolic representation — Part 1: Basic requirements.*
- [4] ISO 3511-2:1984, *Process measurement control functions and instrumentation — Symbolic representation — Part 2: Extension of basic requirements.*
- [5] ISO 3511-3:1984, *Process measurement control functions and instrumentation — Symbolic representation — Part 3: Detailed symbols for instrument interconnection diagrams.*
- [6] ISO 3511-4:1985, *Industrial process measurement control functions and instrumentation — Symbolic representation — Part 4: Basic symbols for process computer, interface, and shared display/control functions.*
- [7] ISO 5455:1979, *Technical drawings — Scales.*
- [8] ISO 6428:1982, *Technical drawings — Requirements for microcopying.*
- [9] ISO 10628-1:1996¹⁾, *Flow diagrams for process plants — Part 1: General rules.*

1) To be published.

Bureau of Indian Standards

BIS is a statutory institution established under the *Bureau of Indian Standards Act, 1986* to promote harmonious development of the activities of standardization, marking and quality certification of goods and attending to connected matters in the country.

Copyright

BIS has the copyright of all its publications. No part of these publications may be reproduced in any form without the prior permission in writing of BIS. This does not preclude the free use, in the course of implementing the standard, of necessary details, such as symbols and sizes, type or grade designations. Enquiries relating to copyright be addressed to the Director (Publication), BIS.

Review of Indian Standards

Amendments are issued to standards as the need arises on the basis of comments. Standards are also reviewed periodically; a standard along with amendments is reaffirmed when such review indicates that no changes are needed; if the review indicates that changes are needed, it is taken up for revision. Users of Indian Standards should ascertain that they are in possession of the latest amendments or edition by referring to the latest issue of 'BIS Handbook' and 'Standards: Monthly Additions'.

This Indian Standard has been developed from Doc: No. BP 24 (0159).

Amendments Issued Since Publication

Amend No.	Date of Issue	Text Affected

BUREAU OF INDIAN STANDARDS

Headquarters:

Manak Bhavan, 9 Bahadur Shah Zafar Marg, New Delhi 110002
Telephones: 323 01 31, 323 3375, 323 94 02

Telegrams: Manaksansth
(Common to all offices)

Regional Offices:

Central : Manak Bhavan, 9 Bahadur Shah Zafar Marg
NEW DELHI 110002

323 76 17, 323 38 41

Eastern : 1/14 C.I.T. Scheme VII M, V.I.P. Road, Kankurgachi
CALCUTTA 700054

{ 337 84 99, 337 85 61
{ 337 86 26, 337 91 20

Northern : SCO 335-336, Sector 34-A, CHANDIGARH 160022

{ 60 38 43
{ 60 20 25

Southern : C.I.T. Campus, IV Cross Road, CHENNAI 600113

{ 254 12 16, 254 14 42
{ 254 25 19, 254 13 15

Western : Manakalaya, E9 MIDC, Marol, Andheri (East)
MUMBAI 400093

{ 832 92 95, 832 78 58
{ 832 78 91, 832 78 92

Branches : AHMEDABAD. BANGALORE. BHOPAL. BHUBANESHWAR.
COIMBATORE. FARIDABAD. GHAZIABAD. GUWAHATI.
HYDERABAD. JAIPUR. KANPUR. LUCKNOW. NAGPUR.
NALAGARH, PATNA. PUNE. RAJKOT. THIRUVANANTHAPURAM.